A Simple Switch for R/C Models

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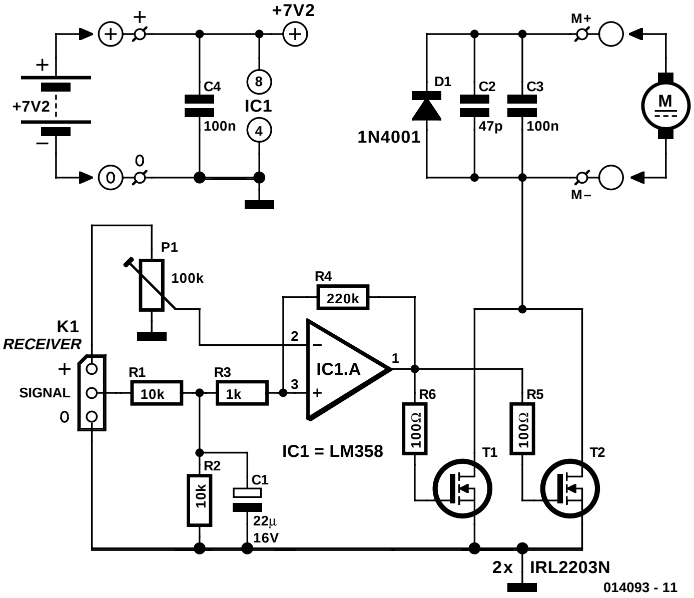
This circuit is a switch for electric motors, which can be operated by a R/C model remote control unit. The electronics are very simple, and what the circuit can do is just as simple: it can only switch on and off, and it does not even have soft-start capability. However, if that is exactly what you want, it is unquestionably the ideal circuit.

The circuit responds to a 50-Hz PWM signal with a pulse width of around 1–2 ms. This is the usual frequency for R/C model remote control units, even though some manufacturers (Simprop) prefer 40-Hz signals. After being smoothed by a filter (R1, R2 and C1), the signal arrives at the non-inverting input of the opamp, which is wired as a comparator. The other input of the comparator is connected to a reference voltage that can be adjusted using P1. If the reference voltage is lower than the rectified PWM voltage, the comparator output goes High, FETs T1 and T2 are switched on and the motor runs. R4 provides hysteresis to prevent the comparator from responding to every minor fluctuation in the voltage on the non-inverting input. The comparator output will only return to Low when the signal voltage is distinctly lower than the reference voltage.

Two power FETs that can handle extremely high currents are built into the circuit. According to the manufacturer, International Rectifier (see http://www.irf.com/product-info/datasheets/data/irl2203n.pdf for the data sheet), the chip itself can switch 113 A, but the thermal resistance of the package limits the maximum switching current to 75 A. However, this value can only be recommended with optimum cooling, and since this switch will usually have to manage with no heat sink at all, the current should be limited to 40 A per transistor. Even 80 A is unquestionably already a lot of current, and there is adequate margin for higher transient currents.



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